

Work Order ID 55510

January 19, 2010 2:25:30 PM



Page 1

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 1/20/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 2/9/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

CMF

Date: 10-1-19

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100



DC

Document Control

DOCUMENT CONTROL

0.00

Memo

0.00

Photocopy bluefile & type labels per PPPD350-748-101

CHG001

SCRAP

110



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

0.00

Memo

0.00

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

ⓧ ~~MB~~ / 10-06-01

120



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

CP 10-06-01

| W/O: | | WORK ORDER CHANGES | | | | | | |
|------|------|--------------------|--|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | | |
| | | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | | |
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Page 2

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Run Start



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| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Draw Number | Draw Rev. | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|---|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
| 130 | Crosstubes | 0.00 | | | | | | | |
| | Crosstubes | | | | | | | | |
| Crosstubes | Memo | 0.00 | | | | | | | |
| | 1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B &C Drill Jigs, Set-up drill table as per QSI 010 | | | | | | | | |
| | 2-Deburr | | | | | | | | |
| | 3-Engrave Part # and Batch # as per Dwg D350-748-141 | | | | | | | | |
| | 4-Remove all marks from tube within limits of D350-748-141 | | | | | | | | |
| | 5- Apply a light coat of LPS3 on the interior of tube Batch: _____ | | | | | | | | |
| 140 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| | QC | | | | | | | | |
| Quality Control | Memo | 0.00 | | | | | | | |
| | CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP) | | | | | | | | |

MB
10-06-03

AWM 10-6-07

SCRAP

| W/O: | | WORK ORDER CHANGES | | | | | | | |
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| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
| | | | | | | | | | |
| | | | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes (No) DQA: / Date: 1103-28

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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| 10.07.08 | 130 | MARK IN TUBE, WHEN REMOVED THERE WAS A 0.012" DEEP FLAT | U 1007-08 | SCRAP TUBE. IN HIGH STRESS AREA CP 10.07.08 See NCR 10-308 | N/A | / | U 1007-08 | / |
| | | | | | | | | |
| | | | | | | | | |

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Page 3

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

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|--------------------------------|---|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
| 150 | Outsource process-Cadplate per QSI017 4.1.9.1 | 0.00 | | | | | | | |
| Outsource3 | Memo | 0.00 | | | | | | | |
| Outsource process - Cad plate | Issue P/O: _____ Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possibe Supplier: Southwest United Industries Ensure Certificate of Conformity is attached | | | | | | | | |
| 160 | Receive & Inspect for Damage & Mat'l Certs | 0.00 | | | | | | | |
| Packaging | Memo | 0.00 | | | | | | | |
| Packaging | Ensure certificate of conformity is attached | | | | | | | | |
| 170 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |

SCRAP

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Page 4

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| 180 | SprayPaint | 0.00 | | | | | | | |
| SprayPaint | Memo | 0.00 | | | | | | | |
| Spray Painting | 1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2 | | | | | | | | |
| 190 | QC14- Inspect Spray Paint | 0.00 | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | Then, Wrap in plastic bag to protect from scratches | | | | | | | | |
| 200 | Crosstubes | 0.00 | | | | | | | |
| Crosstubes | Memo | 0.00 | | | | | | | |
| Crosstubes | 1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS | | | | | | | | |

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Page 5

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|--------------------------------|---|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
| 210 | QC5- Inspect part completeness to step on W/O | 0.00 | | | | | | | |
| QC Quality Control | Memo | 0.00 | | | | | | | |
| 220 | Pick Kit | 0.00 | | | | | | | |
| Packaging Packaging | Memo | 0.00 | | | | | | | |
| 230 | QC4- 100% Inspect kits for completeness | 0.00 | | | | | | | |
| QC Quality Control | Memo | 0.00 | | | | | | | |

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January 19, 2010 2:25:30 PM



Page 6

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

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|--------------------------------|--|----------------------|----------------|--------------|--------------|---------------|---------------|------------------|----------------|
| 240 | Packaging | 0.00 | | | | | | | |
| | | | | | | | | | |
| Packaging | Memo | 0.00 | | | | | | | |
| Packaging | Identify and pack for shipping as per PPP D350-748-101 | | | | | | | | |
| | Location: _____ | | | | | | | | |
| | PPP Rev: _____ | | | | | | | | |
| 250 | QC21- Final Inspection - Work Order Release | 0.00 | | | | | | | |
| | | | | | | | | | |
| QC | Memo | 0.00 | | | | | | | |
| Quality Control | | | | | | | | | |

SCRAP

W 10.11.17

| W/O: | | WORK ORDER CHANGES | | | | | | | |
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NOTE: Date & initial all entries

Picklist Print

January 19, 2010 2:25:29 PM

Page 1

Work Order ID: 55510



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 1/20/2010

Required Date: 2/9/2010

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

D350-748-141TRN

Manufactured No

110

Each

5.0000

1.0000



Crosstube Turning Detail



15-55294 MB 10-05-31

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

FG

5

37995

1

37999

1

40099

1

40103

1

50622

1

ALS4-1032-225

Purchased

No

200

Each

6,686.000

1.0000



Insert



Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

6686

107441

16

110768

6670

AN960JD10

Purchased

No

200

Each

0.0000

1.0000



Washer



| W/O: | | WORK ORDER CHANGES | | | | | | | |
|------|------|--------------------|--|----|------|-----|-------------------------------------|--------------------------|--|
| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
| | | | | | | | | | |
| | | | | | | | | | |

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January 19, 2010 2:25:29 PM

Page 2

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 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

D2856-400

Manufactured No

200 f

290.3921 1.2432



Abraison Strip

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST403

290.3920842

50593

141.312084

52563

149.08

D3500-1

Manufactured No

200 Each

46.0000 4.0000



Saddle

Warehouse Loc Qty Loc Code
Location

Main Warehouse

ST

46

47119

12

47350

5

52326

20

53792

9

January 19, 2010 2:25:29 PM

Shop Packet Print

Page 2

| W/O: | | WORK ORDER CHANGES | | | | | | | |
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January 19, 2010 2:25:29 PM

Page 3

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 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

D3502-1

Manufactured No

200

Each

83.0000

2.0000



Support

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

5

41603

2

42968

2

47120

1

Main Warehouse

ST107

40

52903

40

Main Warehouse

ST168

38

50287

38

| W/O: | | WORK ORDER CHANGES | | | | | | |
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IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

MS21920-20

Purchased

No

200

Each

115.3000 2.0000



Clamp (per MIL-DTL-8783C)

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

115.3

103478

2

106484

12

109269

9.3

110536

10

112307

32

112624

39

112793

11

MS27039-1-10

Purchased

No

200

Each

203.0000 1.0000



Screw

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

203

112794

89

112828

14

112940

100

January 19, 2010 2:25:29 PM

Shop Packet Print

Page 4

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IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

AN4-41A

Purchased

No

220

Each

242.0000

8.0000



Bolt

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

242

105940

4

110363

16

110731

50

111424

50

112082

22

113359

100

AN4-6A

Purchased

No

220

Each

1,559.000

16.0000



Bolt

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

1559

112314

159

112641

100

112720

100

112829

300

112933

300

113149

600

January 19, 2010 2:25:29 PM

Shop Packet Print

Page 5

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| | | | Initial Chief Eng | Action Description Chief Eng | | Sign & Date | | | |
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NOTE: Date & initial all entries

Picklist Print

January 19, 2010 2:25:29 PM

Page 6

Work Order ID: 55510



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 1/20/2010

Required Date: 2/9/2010

Comments: IPP Rev:A New Issue 06-07-05 JLM
IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

AN5-32A Purchased No 220 Each 175.0000 4.0000

Bolt

| <u>Warehouse</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|------------------|----------------|-----------------|
| <u>Location</u> | | |
| Main Warehouse | | |
| ST | 175 | |
| 106242 | 3 | |
| 106519 | 4 | |
| 110363 | 17 | |
| 112805 | 1 | |
| 112933 | 50 | |
| 113121 | 100 | |

AN960JD416 Purchased No 220 Each 149.0000 32.0000

Washer

| <u>Warehouse</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|------------------|----------------|-----------------|
| <u>Location</u> | | |
| Main Warehouse | | |
| ST | 149 | |
| 112314 | 149 | |
| 16941 | 0 | |

AN960JD516 Purchased No 220 Each 0.0000 8.0000

Washer

January 19, 2010 2:25:29 PM

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Page 6

| W/O: | | WORK ORDER CHANGES | | | | | | |
|------|------|--------------------|--|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Picklist Print

January 19, 2010 2:25:29 PM

Page 7

Work Order ID: 55510



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 1/20/2010

Required Date: 2/9/2010

Comments: IPP Rev:A New Issue 06-07-05 JLM
IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

D3501-1 Manufactured No 220 Each 523.0000 16.0000

Bushing

| <u>Warehouse</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|------------------|----------------|-----------------|
| <u>Location</u> | | |
| Main Warehouse | | |
| ST | 523 | |
| 45402 | 19 | |
| 45918 | 200 | |
| 48268 | 204 | |
| 53779 | 100 | |

MS21042L4 Purchased No 220 Each 3,697.000 24.0000

Nut

| <u>Warehouse</u> | <u>Loc Qty</u> | <u>Loc Code</u> |
|------------------|----------------|-----------------|
| <u>Location</u> | | |
| Main Warehouse | | |
| ST | 3697 | |
| 102552 | 6 | |
| 104248 | 6 | |
| 110507 | 184 | |
| 111827 | 2501 | |
| 113422 | 1000 | |
| 15924 | 0 | |

January 19, 2010 2:25:29 PM

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Page 7

| W/O: | | WORK ORDER CHANGES | | | | | | |
|------|------|--------------------|--|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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NOTE: Date & initial all entries

Picklist Print

January 19, 2010 2:25:29 PM

Page 8

Work Order ID: 55510



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 1/20/2010

Required Date: 2/9/2010

Comments: IPP Rev:A New Issue 06-07-05 JLM
IPP Rev:B Update qty of MS21042L5 06-09-12 KJ
IPP Rev:C Rev B 07-11-15 DD
IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

220

Each

550.0000 4.0000



Nut

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

550

110382

10

111636

1

112314

39

113523

300

113537

200

January 19, 2010 2:25:29 PM

Shop Packet Print

Page 8

| W/O: | | WORK ORDER CHANGES | | | | | | | |
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| DATE | STEP | PROCEDURE CHANGE | | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
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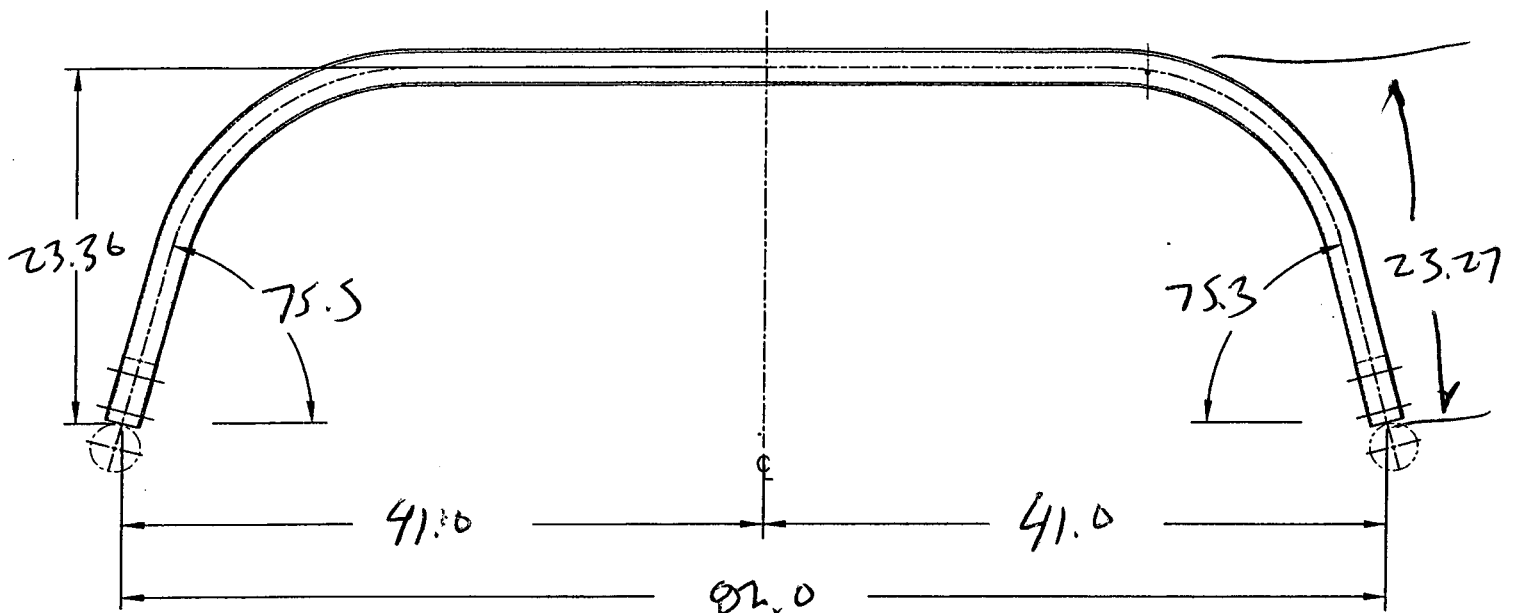
| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | | |
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NOTE: Date & initial all entries

| | | | |
|---|---------------------|--------------|--------------|
| DART AEROSPACE LTD | | Work Order: | 55510 |
| Description: Crosstube High Fwd (AS350/355) | | Part Number: | D350-748-101 |
| Inspection Dwg: D350-748-141 | Rev: D E | | Page 1 of 1 |

10.01.19

| Required Dimension | Min | Max |
|--------------------|-------|-------|
| Height | 23.13 | 23.37 |
| 1/2 Span | 40.78 | 41.02 |
| Angle | 75 | 77 |
| Total Span | 81.56 | 82.04 |



| Comments |
|---------------|
| Twist = 0.219 |
| |
| |
| |

| | |
|-----------------|----------|
| QC15 Inspection | CP |
| Date | 10.06.01 |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|-----------|------------|----------|
| A | 07.02.06 | New Issue | KJ/JM | |

| W/O: | | WORK ORDER CHANGES | | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|--|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector | |
| | | | | | | | | |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

| Item | Qty -141 | Part Number | Description |
|------|-------------|---------------|--|
| 1 | X | D350-748-141 | CROSSTUBE ASSEMBLY (AS 350/355 HI FWD) |
| 2 | 1 | D6017-115 | CROSSTUBE |
| 3 | 2 | D3502-1 | SUPPORT |
| 4 | 2 | D2856-400-710 | ABRASION STRIP |
| 5 | 1 | AELS-1032-225 | INSERT |
| 6 | 1 | NAS1149D0363J | WASHER (OR AN960JD10) |
| 7 | 2 | MS21920-20 | CLAMP (PER DART SPEC. M-MS21920-20) |
| 8 | 1 | MS27039-1-10 | SCREW |

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

| | | | |
|---|---|--|--------------|
| E | REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3) | RF | 09.09.30 |
| D | MAG. PARTICLE AND CAD PLATE AS MFD. | CP | 06.10.31 |
| C | ADD CAD PLATING | CP | 06.08.14 |
| B | ADD D6017-115 & PRIME AND PAINT | CP | 06.06.30 |
| A | NEW ISSUE | CP | 06.03.31 |
| REV. | DESCRIPTION | BY | DATE |
| DESIGN | RF | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| DRAWN | RF | DRAWING NO. | REV. E |
| CHECKED | RF | D350-748-141 | SHEET 1 OF 4 |
| MFG. APPR. | RF | TITLE | SCALE |
| APPROVED | RF | CROSSTUBE (AS 350/355 HI FWD) | NTS |
| DE APPR. | RF | DATE 09.09.30 | |
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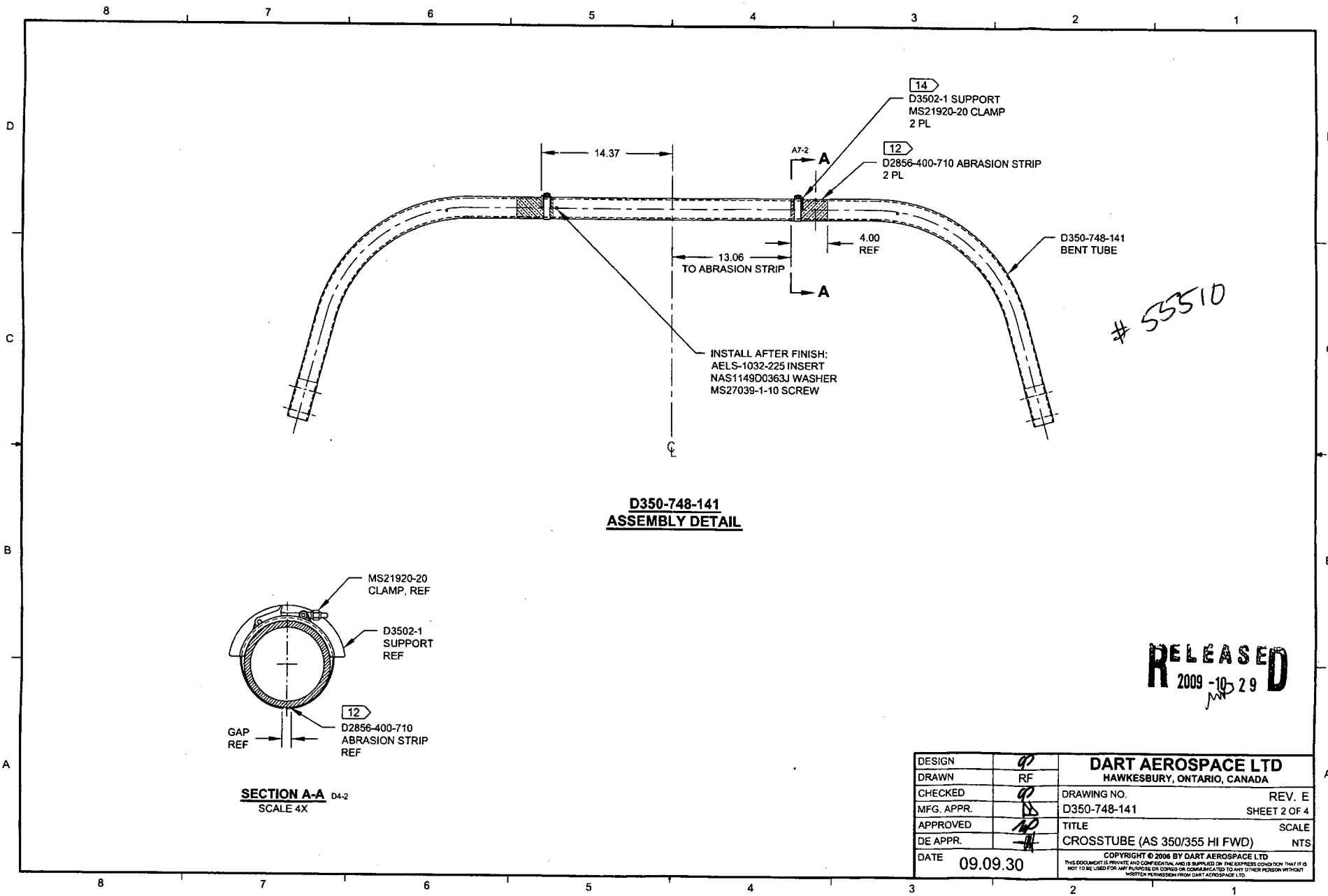
| W/O: | | WORK ORDER CHANGES | | | | | | |
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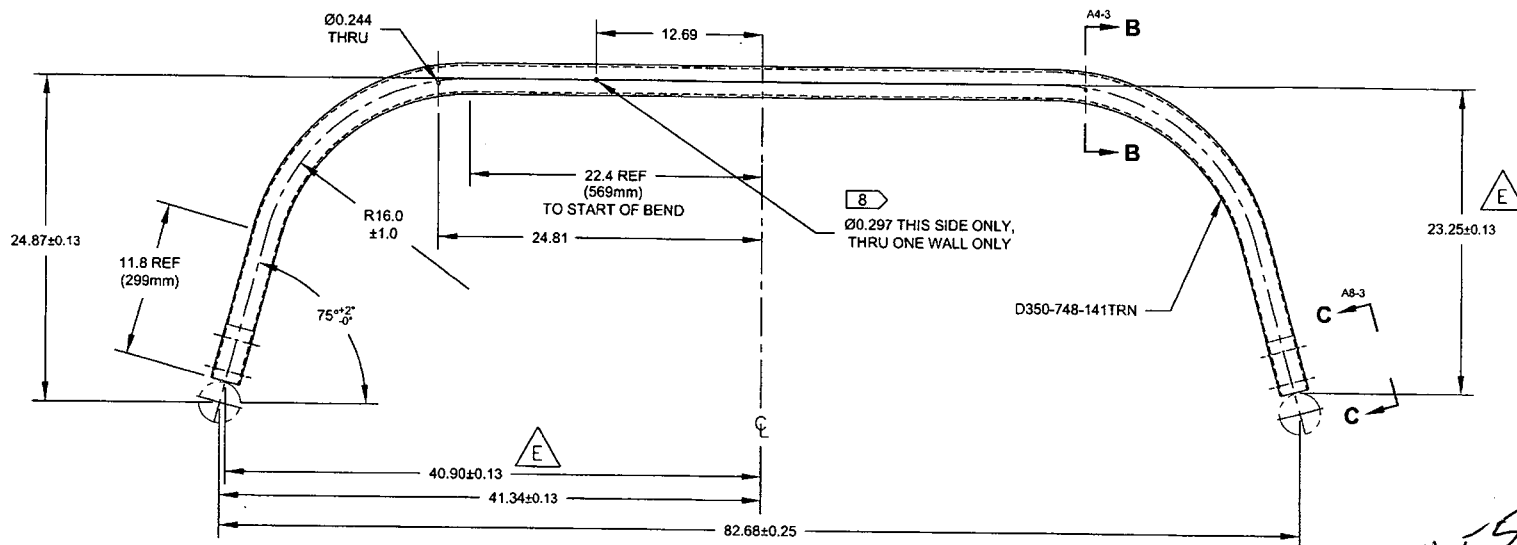
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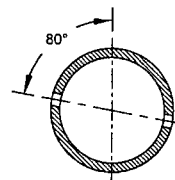
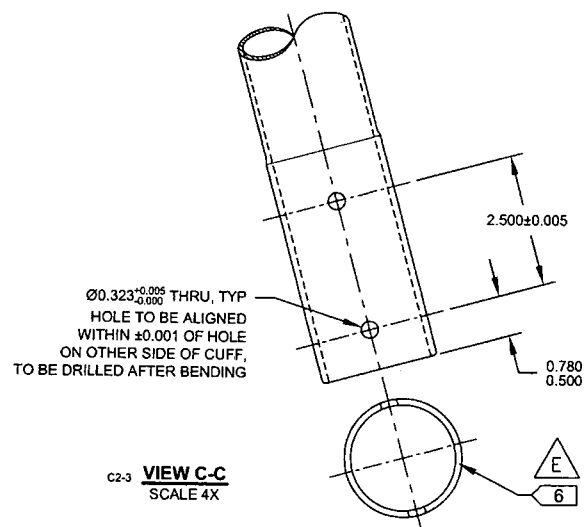
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NOTE: Date & initial all entries



D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B 03-3
SCALE 4X

RELEASED
2009-10-29

| | | | |
|---|----------|--|--------------|
| DESIGN | 97 | DART AEROSPACE LTD | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | 97 | DRAWING NO. | REV. E |
| MFG. APPR. | 13 | D350-748-141 | SHEET 3 OF 4 |
| APPROVED | 10 | TITLE | SCALE |
| DE APPR. | 14 | CROSSTUBE (AS 350/355 HI FWD) | NTS |
| DATE | 09.09.30 | COPYRIGHT © 2006 BY DART AEROSPACE LTD | |
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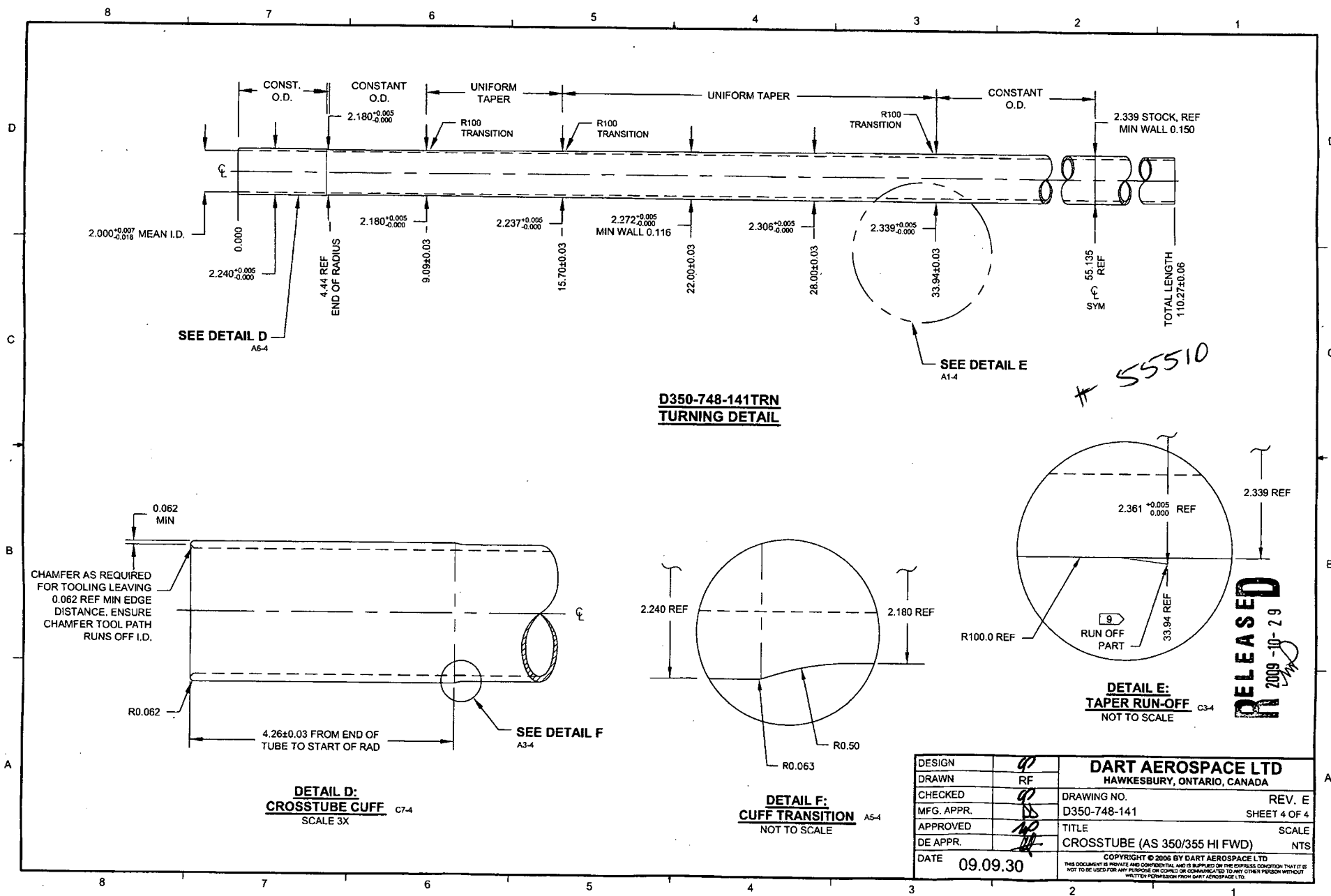
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